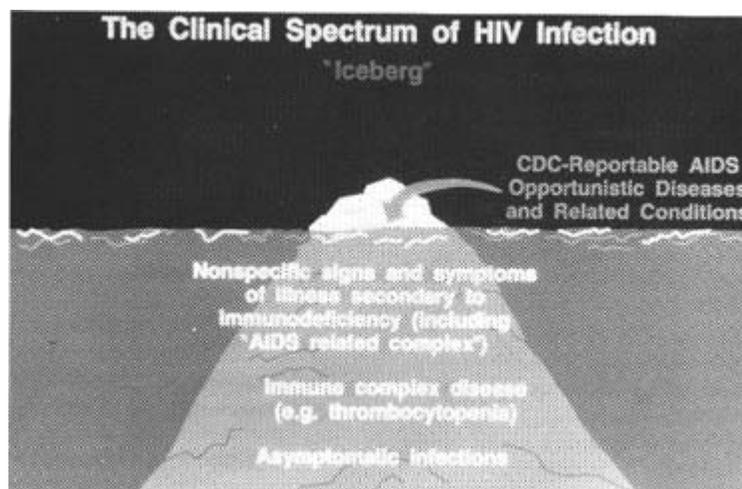


2

PHYSIOLOGICAL ASPECTS OF NURSING CARE

Infection with the human immunodeficiency virus (HIV) leads to a progressive loss of immune function and the development of opportunistic infections and malignancies rarely observed in individuals with an intact immune system. Nearly all organ systems are affected either directly by the immunodeficiency state or indirectly by the malignant and infectious sequelae of HIV infection. The natural history of HIV infection ranges from acute initial infection through an essentially asymptomatic period through a variety of symptoms culminating in the acquired immunodeficiency syndrome (AIDS). At the present time, death is the ultimate outcome for most, if not all, individuals who are infected with HIV.

HIV infection can be thought of as a chronic illness, although it does not strictly fit this definition. For some individuals rapid progression is found along the HIV-infection spectrum, while for others periods of remission and exacerbation occur. The multiplicity of potential opportunistic infections and malignancies coupled with the possibly adverse effects of treatment results in a complicated picture. Individuals frequently have multisystem problems that can be synergistic. The interaction between the physical and psychological effects complicates the picture further. Yet, for research purposes, often one problem must be isolated for effective study.



Important among the nursing goals are relief of distressing symptoms resulting from the disease

process, identification of optimal ways to administer medical treatment, achievement of increased compliance with therapeutic regimens, management of therapeutic side-effects, prolongation of distress-free intervals, and improvement of quality of life. Ethical issues surrounding the participation of HIV-infected persons in clinical trials also warrant nursing attention. One such issue involves the clarity and manner in which patients are informed of treatment options and can exercise those options. This

chapter focuses on nursing strategies for the amelioration of physical symptoms and on nursing interventions that may influence the progression of disease and the quality of life during that period.

State of the Science

Interventions to Ameliorate Physical Symptoms

Physical problems frequently associated with HIV infection include problems of ventilation, nutrition, elimination, neurological function, host defenses, energy maintenance, and comfort. Whereas some manifestations of HIV infection are amenable to medical intervention, other symptoms are less adequately relieved by drug therapy alone. A major thrust of nursing research should be to identify promising interventions to alleviate the physical symptoms associated with HIV infection. Research might focus on problems refractory to, or incompletely relieved by, medical intervention, as well as development of strategies to ameliorate the physical symptoms that are secondary to medical management of HIV infection.

The Centers for Disease Control (1986) has indicated that, of all the organ systems affected by the HIV, involvement of the lungs is most common. Respiratory complication commonly manifests as dyspnea with a nonproductive cough (Stover, White, Romano, Gellene, & Robeson, 1985). The most frequent infecting agent in adults, yet less common in children, is *Pneumocystis carinii* (Murray et al., 1984; Thomas et al., 1984). Initial episodes of *P. carinii* pneumonia show good response to trimethoprim-sulfamethoxazole (TMP-SMX) or to pentamidine isethionate (Masur & Kovacs, 1988). However, 25-50% will have another episode of PCP within 12 months. The more widespread prophylactic use of inhaled pentamidine is expected to further decrease morbidity and mortality from PCP, although side effects occur (Leoung, 1989). No nursing studies targeted specifically at ameliorating the dyspnea associated with *P. carinii* pneumonia were identified in the literature. There is, however, a substantial knowledge base on which such studies could be founded. Strategies to successfully reduce the sensation of dyspnea in persons with chronic obstructive pulmonary disease, lung cancer, and asthma have been reported (Brown, Carrieri, Janson-Bjerklie, & Dodd, 1986; Carrieri & Janson-Bjerklie, 1986). Interventions such as positioning (Rifas, 1980), energy conservation (Carrieri & Janson-Bjerklie, 1986), and relaxation therapy (Renfro, 1988) may prove useful in relieving the dyspnea associated with the pulmonary manifestations of HIV infection. Studies to determine whether these interventions successfully influence the comfort level of persons with HIV-associated pulmonary dysfunction need to be undertaken. In addition, because pulmonary infection is the most frequent cause of death from AIDS (Hughes, 1987), the potential effect of these strategies on survival should be explored.

Other disabling complications of HIV infection include alterations in nutrition and elimination (Gelb & Miller, 1986). HIV-associated malnutrition, which is a frequently documented consequence of HIV infection (Dworkin et al., 1985; Kotler, Wang, Pierson, 1985), is thought to result from a reduction in nutrient intake, increased basal metabolic rate, and malabsorption (Chlebowski, 1985). Reduction in nutrient intake has been attributed, in part, to anorexia, altered taste sensations, and dysphagia and odynophagia (pain on swallowing), resulting from infection of the oral cavity and the esophagus (Resler, 1988). Nausea and vomiting developing as a result of radiation and chemotherapy of HIV-associated malignancies limit adequate nutritional intake

(Resler, 1988). An elevated basal metabolic rate, although not directly demonstrated in persons with AIDS, has been reported in persons with ongoing infections (Scrimshaw, 1977). Malabsorptive difficulties associated with HIV infection are thought to occur either as the result of direct damage to the absorptive surface of the gut by HIV or secondary to opportunistic infections of the gastrointestinal tract such as *Cryptosporidium* (Weber, 1986). Although there are numerous review articles, opinion papers, and primary research reports describing the nutritional problems associated with HIV infection, no well controlled studies examining symptom management are documented in the literature to date.

The oncology literature provides a foundation from which such nutritional intervention strategies can be developed. For example, Sims (1987) has reported that behavioral methods, such as relaxation therapy, have been successfully employed to relieve nausea and vomiting associated with cancer chemotherapy, and Dixon (1984) has reported improved performance and nutritional status of cancer patients over time. Cancer patients, like persons infected with HIV, experience anorexia and taste alterations. Research documenting changes in taste acuity in cancer patients has been instrumental in guiding the development of more palatable dietary interventions to use with this population (Carson & Gormican, 1977; Gormican, 1980). Similar studies need to be done with HIV-infected individuals. Mouth pain due to candidal, herpes simplex and other lesions is common in persons infected with HIV (Weber, 1986). Persons with AIDS are also reported to be exquisitely sensitive to developing mucosal toxicity following oral radio-therapy for the treatment of malignancy (Cooper & Fried, 1987). Research studies, extrapolated from earlier reports related to mouth-care interventions for mucositis in oncology patients (Gormican, 1980; Dudjak, 1987) can be designed to test methods to optimize comfort of persons infected with HIV and be supportive of oral nutrient intake.

Diarrhea is a common presenting symptom of HIV infection. Although a variety of parasites, viruses, and bacteria have been implicated as the causative agents, diarrhea and weight loss may occur in the absence of an identifiable organism (Weber, 1986). The principal agents responsible for diarrhea in association with HIV infection are *Cryptosporidium* and *Iso spor a belli* (Cello, 1988; Gelb & Miller, 1986), organisms that infect the small intestine resulting in a profuse, often unrelenting secretory diarrhea (Modigliani et al., 1985). Currently, no known drug will eradicate these parasites. There is a dearth of published nursing research related to the symptomatic management of diarrhea in HIV-positive persons, particularly those suffering from diarrhea due to *Cryptosporidium* or diarrhea of unknown etiology. In contrast, a vast body of knowledge on the management of pediatric diarrhea is available (Brown & MacLean, 1984; Leung, Taylor, Geoffrey, & Darling, 1988; Orenstein, 1986). Drawing from that knowledge base, the relative efficacy of various oral rehydration therapies for managing diarrhea in HIV-infected individuals warrant evaluation. Furthermore, studies characterizing the benefits of enteral versus parenteral therapies for managing diarrhea as well as maintaining optimal nutritional and fluid and electrolyte status require investigation.

More than 40 percent of all HIV-infected individuals suffer neurological complications (Levy, Bredlesen, & Rosenblum, 1985), the major proportion manifesting as AIDS-related dementia (McArthur & McArthur, 1986). About 75 percent show nervous system abnormalities at autopsy (Levy, Janssen, Bush & Rosenblum, 1988). The early symptoms of AIDS-related dementia include apathy, depression, and withdrawal (McArthur & McArthur, 1986). As the syndrome progresses, additional difficulties with learning, language, and memory develop (McArthur & McArthur, 1986). In children, failure to achieve or loss of developmental milestones are common signs of central nervous system pathology (Belman et al., 1985; Epstein et al., 1985). Encephalopathy associated with HIV infection may be due to opportunistic infections or the presence of the HIV virus in the brain (McArthur & McArthur, 1986; Price et al., 1988). Although certain opportunistic infections of the brain may respond to medical intervention, neurologic changes resulting from HIV infiltration of the brain are less readily managed

(McArthur & McArthur, 1986). Recently, however, some success with zidovudine (AZT) has been reported (Schmitt et al., 1988). Confirmation of reversal of symptoms of dementia in children has been reported with AZT (Pizzo, Eddy, & Fallon, 1988). An important focus of nursing research should involve the identification of strategies to promote patient comfort and delay the decline of neurocognitive function in HIV-infected persons. Such research can determine the relative efficacy of interventions that have proved successful in supporting persons with memory dysfunction and/or Alzheimers disease. Studies examining memory improvement strategies such as rehearsal (Harris, 1984), mnemonics (Harris, 1984), exercise (Maletta, 1988), and psychotherapy (Beck & Heacock, 1988) are based in the Alzheimer's disease literature. Furthermore, interventions should be identified to facilitate communication (Beck & Heacock, 1988), control wandering (Hussian & Brown, 1987), and decrease agitation (Beck & Heacock, 1988) in persons with AIDS-related dementia.

Recurrent fevers and opportunistic infections are common presenting symptoms of HIV infection (Redfield, Wright, & Tramont, 1986). As described previously, opportunistic infections may target the central nervous system, respiratory system or gastrointestinal tract. Nearly all organ systems can be affected, including skin and mucous membranes (Farthing, 1986). Certain infections (for example, early thrush) are responsive to medical management, whereas others (for example, Cryptosporidium) are refractory to treatment and may be a cause of death. An important area for nursing research related to caring for persons with compromised host defenses should involve the investigation of strategies to prevent opportunistic infections. Although no such research has been conducted in HIV-infected persons to date, extensive literature exists in the fields of critical care and oncology from which to draw. Potential researchable topics include optimal management of venous access devices (Hampton & Sherertz, 1988; Keeler, McLane, Covey, Smith, & Holm, 1987) and urinary catheters (Burke, Larsen, & Stevens, 1986). Because infection of hospitalized persons is frequently the result of indigenous cutaneous microflora (Noble, 1986), appropriate handwashing measures by health care providers (Maki, 1986; Morrison, Gratz, Cabezudo, & Wenzel, 1986) and use of antiseptic skin cleaning agents for bathing of HIV-infected persons (Kaiser, Kernodle, Barg, & Petracek, 1988) should be investigated.

Schimpff et al. (1972) reported that a high proportion of all nosocomial infections in immunosuppressed cancer patients occurs as a result of hospital-acquired organisms that colonize the gastrointestinal tract. While the normal gut mucosa is relatively resistant to bacterial colonization, treatment with systemic antibiotics facilitates colonization (Van der Waaij, Berghuis, & Lekkerkerk, 1972). It has been suggested that immunosuppressed persons, especially those receiving antibiotic therapy, may benefit from low microbial diets (Remington & Schimpff, 1981; Somerville, 1986). Extensive research on low microbial diets has been conducted in ultra-isolation environments (Aker & Cheney, 1983). The potential benefit of these diets to HIV-infected persons either at home or in a general hospital unit warrants consideration.

Difficulties in maintaining energy may arise from a variety of sources. Fatigue may occur as the result of an increased metabolic rate from fevers, the effort involved in dyspnea in combination with an oxygen deficit, systemic infections, sleep disturbances, and cachexia. In addition, certain psychological factors act to produce fatigue (Nelson, 1987; Tindall, Cooper, & Donovan, 1988). It is postulated that sleep disturbances may contribute to fatigue feelings in HIV-infected persons (Norman et al., 1988). Other than in the work setting, relatively little nursing research has addressed fatigue, although assessment and measurement of fatigue have been studied in persons with multiple sclerosis, botulism, renal failure, and cancer (Cohen & Hardin, 1989; Cohen et al., 1988; Jamar, 1989; Hart, 1978, Haylock & Hart, 1979; Srivastava, 1989). Piper (1989) recently reviewed nursing studies on chronic fatigue. Studies aimed at both short- and longer-term strategies in fatigue management are warranted.

Persons infected with HIV frequently experience discomfort and/or pain for many reasons including multisystem organ involvement. As described previously, discomfort may result from pneumonia, gastrointestinal tract abnormalities, dermatological lesions or central nervous system infection. Painful peripheral neuropathies have also been reported (Lange, Britton, Younger, & Hays, 1988). Medical therapies utilized to treat the primary immunodeficiency or its malignant and infectious sequelae also may induce uncomfortable side-effects, such as nausea, headache, myalgia, muscle pain, and mucositis (Cooper & Fried, 1987; Richman et al., 1987). A number of nonpharmacologic nursing interventions to alleviate patient discomfort have been studied in critical care, surgical, and cancer patient populations (Harrison & Cotanch, 1987; McGuire, 1987). Approaches found useful include relaxation (Radwin, 1987), therapeutic touch (Wright, 1987) and hypnosis (Cotanch, Harrison, & Roberts, 1987), but their efficacy in persons with HIV infection has yet to be documented. Studies of alternative methods of delivering prescribed analgesia are also needed.

Interventions to Influence Disease Progression

Behavioral and other nonmedical approaches have been utilized to alter the course of various illnesses as well as to ameliorate both symptoms of and unfavorable responses to therapy. This contributes to an improved quality of life for the individual, although it may or may not affect the length of life after diagnosis or the ultimate outcome of the disease. Behavioral and other nonmedical approaches have been reported most frequently for cancer, autoimmune disorders such as rheumatoid arthritis, and other chronic illnesses such as multiple sclerosis. There is a dearth of research on the use of nonmedical interventions to delay the progression of HIV infection. While the major determinant of the course of the disease is the viral infection itself and its effect on the immune system of the individual, a multitude of variable factors may contribute to the speed and efficiency of disease progression (Curran et al., 1985). As in other disorders, these may be multifactorial and may include genetic factors, stress, nutritional status, and others.

An approach to understanding such interaction effects in illness is through the relatively new field of psychoneuroimmunology. The early work of Solomon and Moos (1964) explored the interaction of stress, immunological deficiency, and disease, and was soon expanded to include bidirectional interaction among the nervous system, endocrine system, immune response and its modulation, stress, and disease (Ader, 1981; Solomon, 1987). By extrapolation, behavioral and psychosocial factors become potential mediators of stress, and provide a basis for actions that enhance functioning and maximize both psychological and physical comfort. While the impact of stress and other behavioral variables on immune response and disease outcome has been investigated, few studies have examined these variables in immunologically compromised humans (Solomon & Temoshok, 1987).

Less traditional nonmedical therapeutic approaches studied by nurses and others include exercise, relaxation, visualization and guided imagery, therapeutic touch and massage, nutritional manipulations, and stress inoculation techniques. These techniques have been used to relieve pain, improve rest and sleep, decrease stress and anxiety, relieve treatment-related side-effects, and enhance immune status.

The effects of exercise on anxiety, depression, cognition, performance, personality, infection, the immune system, stress, fatigue, and sleep have been investigated. A review article by Hughes (1984) summarizing most of the pre-1984 work pointed out methodological limitations, including inadequate objective outcome measures and inappropriate research design. Hughes (1984) concluded that exercise improves self-concept, but the research did not verify the improvement of anxiety, depression, cognition, or unfavorable personality traits. In a 1984 review, Simon concluded that further study was necessary to determine if exercise affects clinical response to infection. Later research has shown conflicting results, some of which may be explained by the

type of subjects studied (healthy versus nonhealthy), and specific outcome criteria used. Moderate exercise appears to boost the function of certain cellular components of the immune system, whereas intense exercise may damage the immune system causing immune deficiency (Fitzgerald, 1988). These studies should be interpreted with caution, however. Reliable pre- and post-exercise assessments and long-term outcome measures have not been readily utilized in humans, and such research is often conducted with athletes as study subjects (Keast, Cameron & Morton, 1988). Many studies investigating the effects of various types of physical exercise on immune system parameters have not been relevant to the problems of HIV infection; they were carried out in healthy subjects, did not use control groups, measured short-term outcomes, failed to control the exercise protocol or document compliance, produced equivocal results or were conducted with nonhuman subjects (for example, Keast et al., 1988; Landmann, Portenier, Staehelin, Wesp & Box, 1988; Pahlavani, Cheung, Chesky, & Richardson, 1988; Pedersen et al., 1988). As an adjunct measure for management of nausea in breast cancer patients undergoing chemotherapy, Winningham and MacVicar (1988) demonstrated improvement in nausea with moderate aerobic activity.

Relaxation training has been used to reduce anxiety and stress, and subsequently reduce pain and/or promote sleep in a variety of studies. There are many types of relaxation techniques, including those in which an individual attempts to consciously control some body response, such as muscle tension or blood pressure, by cortically influencing arousal levels. Other relaxation techniques, such as habituation, use sensory integration to modify incoming neural input primarily at subcortical levels (Sims, 1987). Systemic desensitization has been effective in reducing anticipatory nausea in some studies (Morrow & Morrell, 1982). The majority of studies, particularly those conducted by nurses, have utilized progressive muscle relaxation training (PMRT) in which both muscle tensing and relaxing are employed.

Studies have been carried out on the effects of relaxation to control pain, hypertension, headaches, and insomnia; to avoid side-effects of chemotherapy; and to alleviate the discomfort of unpleasant medical therapies. A review of PMRT research related to the side-effects of chemotherapy concluded that PMRT can be effective in the control of nausea and in increasing food intake (Carey & Burish, 1988). PMRT is often used in conjunction with visualization techniques or as part of stress inoculation packages that are designed to assist the individual in becoming accustomed to stress. Longworth (1982) used a type of massage to induce relaxation, and examined its effect on selected psycho-physiological variables. The majority of relaxation studies reported in the nursing literature have been conducted in oncology settings. Sims (1987) has reviewed many of these studies. Ludwick-Rosenthal and Neufeld (1988) reviewed relaxation studies in relation to stress management for persons undergoing noxious medical procedures.

Imagery and visualization techniques may take different forms, including imaginative transformation and reinterpretation, imaginative inattention, imaginative transformation of context, and distraction (Driscoll, 1987). Imagery can be used to desensitize persons to anxiety-producing stimuli (Mast, 1986), and to live future events in the mind's eye to improve coping with the actual event (Collison & Miller, 1987). The most frequent uses of imagery techniques have been to reduce noxious treatment effects in cancer patients, particularly those undergoing chemotherapy (Carey & Burish, 1988; Lyles, Burish, Krozely, & Oldham, 1982). Imagery is often used with other techniques such as relaxation or music therapy (Donovan, 1981; Frank, 1985). One of the best known visualization techniques is the Simonton method, which combines counseling, relaxation, and visualization. In this method, most commonly used with cancer patients, the person mentally pictures his or her disease and then pictures his or her medical treatment as a counterforce, eventually defeating the disease (Klisch, 1980). Few controlled studies of Simonton's method are available, and this technique has been classified as unproven by the American Cancer Society (1982).

Because visualization and guided imagery are often used and studied in conjunction with relaxation (Holden-Lund, 1988), contributions of the individual therapies are difficult to sort out. Few adequate studies of imagery techniques alone have been reported in the literature, and combination studies suffer from the same deficits previously discussed.

The healing powers of touch have been described since ancient times, and touch (and massage) has fallen within the purview of nursing from earliest times, often in the form of the backrub. Triplett and Arneson (1979) reported on combinations of verbal and tactile comfort in young children and found age was important in their response. The nursing literature on true touch is summarized in Weiss (1988). Other forms of touch that have been studied experimentally are massage, therapeutic touch, and acupressure therapy.

Massage involves various techniques to promote relaxation, relieve stress, stimulate circulation, increase muscle tone and mobilize joints. It has been claimed, therefore, that massage can reduce edema, decrease fatigue, relieve pain, improve sleep, decrease stress, both stimulate and quiet the nervous system, facilitate communication, decrease isolation, and promote gastrointestinal motility (White, 1988). Most of the reports regarding the effectiveness of massage have been descriptive or anecdotal or have suffered from the same methodological deficiencies described earlier in this chapter.

Therapeutic touch seeks to effect a transfer of energy from the practitioner and help to repattern the client's disharmonic energies (Krieger, Peper, & Ancoli, 1979; Macrae, 1979). It may result in a relaxation response (Randolph, 1984), affect nervous system functioning (Boguslawski, 1980), or facilitate pain relief (Boguslawski, 1980). It is sometimes used in combination with meditation, guided imagery, or counseling, and therefore, may not be solely responsible for the claimed therapeutic benefits. Again, few controlled studies have been reported in the literature. In one, Randolph (1984) compared the effects of therapeutic and physical touch on skin conductance levels, muscle tension levels, and peripheral skin temperature in female college students exposed to a stressful stimulus. Randolph found no statistically significant differences between the two techniques. Keller & Bzdek (1986) reported that therapeutic touch resulted in reduction in head-ache pain in a group of volunteers with tension headache. Despite these apparent results, Clark and Clark (1984) found little support for the effectiveness of the practice in a critical review of the literature.

Acupressure is a form of massage using energy channels called meridians. There are a number of different systems such as Shiatsu, Acu-Yoga, reflexology and Jin-Shin Do (White, 1988; Hare, 1988). While it is speculated that endorphin release, immune system stimulation and hormonal changes may result from acupressure, little objective research supports these claims.

While it has been postulated that an individual's nutritional status may predispose one to HIV infection and potentially alter the course of the disease (Hebert & Barone, 1988; Kotler, 1987), no well controlled studies could be found addressing the significance of nutritional deficiencies as cofactors in HIV infection. It is recognized that weight loss in HIV-infected persons may precede the development of opportunistic infections or malignancies (Chlebowski, 1985), supporting a role for malnutrition and deficiencies in the progression of this disorder. The impact of specific nutrients such as amino acids, vitamins, and minerals on immune status has been well established (Corman, 1985). Inadequate caloric or total protein intake has a profound effect on the immune system, particularly those processes requiring T-lymphocyte participation (Corman, 1985). The changes in immune status associated with AIDS closely parallel those reported for protein-calorie malnutrition (Jain & Chandra, 1984). Because it is known that adequate refeeding of individuals with protein-calorie malnutrition results in a rapid normalization of immune status (Chandra, 1983), optimizing the nutritional status of HIV-infected persons might delay or even reverse the decline in immune function during the course of illness. In light of the observations that nutrients

have a profound effect on immune function, recent attention has focused on the role of nutritional manipulation in altering the course of certain diseases. In experimental models, restriction of calories or protein delayed the onset and severity of symptoms in autoimmune-prone strains of animals (Homsy, Morrow, & Levy, 1986). The impact of nutritional manipulation on the reversal of immune deficiency states is less well defined and warrants further exploration.

Stress inoculation often includes multiple cognitive and behavioral strategies aimed at relieving distress. These have most commonly been reported in relation to pain, cancer chemotherapy, hypertension, stressful medical procedures, and presurgical anxiety-producing situations (Ludwick-Rosenthal & Neufeld, 1988; Moore & Altmaier, 1981). A consistent problem has been in the interaction of the multiple components being manipulated as well as other methodological concerns such as lack of adequate control groups and compliance with the research protocol.

Research Needs and Opportunities

Persons infected with HIV incur physical problems in seven major areas that fall within the realm of nursing and should be priorities in a major research initiative. The development of nursing interventions to provide symptom relief in these problem areas requires a concerted research effort. Palliation of dyspnea, alleviation of nutrition and elimination disturbances, management of central nervous system dysfunction, prevention of nosocomial infections, support of energy maintenance, and alleviation of physical discomfort would clearly relieve a major health care burden. These problem areas can be addressed by building on available knowledge from related fields and other patient populations.

Nursing and other disciplines have used a variety of therapies to manage symptoms related to disease and side-effects of therapy, in an attempt to alter the quality and perhaps the length of the affected person's life. Little well designed, controlled research with adequate sample sizes has been done, and there is no definitive information on beneficial outcomes related to disease progression and quality of life issues, except perhaps in the case of progressive muscle relaxation. Demonstrations of both short- and long-term benefits, assessment of patient skill and compliance with the regimen, and research-based explanation of the mechanisms underlying such therapies as touch and visualization are lacking. Convincing and clinically relevant results may also depend on the subjective or objective measurement of outcomes such as improved quality of life, comfort, and decreased anxiety, in addition to traditional outcomes such as response to treatment, disease-free intervals, and survival. The most promising interventions for future study based upon the supply of adequately trained nurse researchers and the research data base appear to be relaxation with or without visualization and touch, nutritional interventions, and exercise.

It is important to examine both short- and long-term effects and both physiological and psychological variables. While single problems may be selected for study, the researcher should remain cognizant of the multiplicity of health-care needs of each HIV-infected person, and of the potential impact of the clarity and manner in which infected individuals are informed of their treatment options.

Recommendations

Based on the foregoing assessment of research needs and opportunities in "Physiological Aspects of Nursing Care," the Panel has made the following recommendations concerning research in this area over the next five years.

- Investigate strategies to effectively manage physical symptoms associated with HIV infection, including: dyspnea, inadequate nutrition, diarrhea, neurocognitive dysfunction,

- nosoco-mial infections associated with compromised host defenses, fatigue, and pain.
- Assess short- and long-term effects of behav-ioral and other nonmedical therapies on disease progression and quality of life in HIV-infected persons. Examples include: exercise, relaxation, touch/massage, and nutritional support.
- Evaluate strategies to increase the adherence of HIV-infected persons to therapeutic regimens.
- Describe the clarity and manner in which HIV-infected persons are informed of their treatment options and how this affects decision-making ability.

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